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IN REGARD TO

ANIMAL VACCINATION.

BY

FRANK P. FOSTER, M. D.,

LATE DIRECTOR OF THE VACCINE DEPARTMENT OF THE NEW YORK DISPENSARY.

READ BEFORE THE NEW YORK ACADEMY OF MEDICINE, DECEMBER 4, 1873.

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PROPOSITIONS

IN REGARD TO

ANIMAL VACCINATION.

BY FRANK P. FOSTER, M. D.,

DIRECTOR OF THE VACCINE DEPARTMENT OF THE NEW-YORK DISPENSARY.

MR. PRESIDENT AND FELLOWS OF THE ACADEMY:

I HAVE not prepared a formal paper, for the reason that, although I have never presented this subject before any of the medical societies of New-York, the majority of the gentlemen present are, I think, acquainted, at least in outline, with what opportunity has enabled me to observe in regard to animal vaccination during the last three years. I have, however, written down certain propositions, which seem to me to embody the truth concerning the principal points which have been, and perhaps now are, to a certain extent, the subjects of difference of opinion; and, in order not to take up the time of the Academy needlessly, I shall content myself with stating, orally, certain facts which go to support them.

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PROPOSITION I.—*The vaccination of the human subject with animal vaccine is attended with a degree of success, as regards the production of vaccinia, equal, to say the least, to that obtained by any other method of vaccination.*

I use the term "any other method" advisedly, meaning not merely that stored animal vaccine furnishes a degree of success equal to that obtained with stored humanized virus, but that, as I hope to show you, this degree of success is not exceeded even by *arm-to-arm* vaccination, *i. e.*, the direct transfer of fluid lymph from the arm of one child to that of another.

For the sake of comparison, we must first establish a standard of the degree of success which may fairly be expected to be attained, under ordinarily favorable circumstances, by the arm-to-arm method. We are not called upon to accept, as this standard, that phenomenal degree of success which has sometimes been reached by vaccinators of exceptional skill, such, for instance, as Mr. Marson, who, as stated by Seaton ("*Hand-Book of Vaccination,*" London, 1868, p. 160), once did over 2,000 vaccinations without a single failure. This degree of success, I repeat, we are not to accept as the standard, although some of the results which I shall call your attention to, are even more remarkable.

I have thought it fair to take, as the standard, the results obtained by the public vaccinators of London. I presume it will be generally admitted that arm-to-arm vaccination is as carefully and skillfully done in Great Britain as anywhere, and the public vaccinations of London must certainly be a fair example of those of Great Britain at large. I have here Mr. John Simon's well-known and deservedly-esteemed "Blue Book," entitled "Papers Relating to the History and Practice of Vaccination," published in 1857. On page 72 of the work

I find a tabular statement of the "infantine vaccinations performed in the metropolis during the triennial period, 1854–'56," showing, in separate columns, the number of births, the number of successful vaccinations of children under one year of age, the total number of such vaccinations, and the proportion of vaccinations to births, as they occurred in the various parishes composing the British metropolis. I have calculated, in the case of each parish, the proportion of the successful vaccinations to the whole number, and have added the results in a fifth column. In three of the parishes there were no failures, the percentage of successes being, as a matter of course, 100; in one parish the percentage is recorded as low as 85.65; and, in the remaining 34 parishes, the figures range between these two extremes. By adding together the figures returned from all the parishes, we find that, in the whole metropolis, during the three years mentioned, there were 132,303 vaccinations of children under one year of age, of which number, 127,858 were successful, or 96.64 per cent. We may, then, I think, fairly take this per centage as our standard for comparison.

Does the use of animal vaccine furnish equally satisfactory results? I regret that I am not able to present a complete report of the results obtained with the animal vaccine which I have furnished in such large quantities to the profession during the last three years, in my capacity of director of the Vaccine Department of the New-York Dispensary. I have, however, through the kindness of a few of our professional brethren in the cities of Boston (and vicinity), Buffalo, and Baltimore, been favored with reports of the results, so far as known, in a very large number of vaccinations done in those cities with the animal virus, during a period beginning in the autumn of 1872, and ending early in the spring of the present year. The gentlemen to whom I refer are, Dr. E. C. W. O'Brien, Health Physician of Buffalo; Dr. Norton Folsom, Resident Physician of the Massachusetts General Hospital, Boston; Drs. R. M. Otis, S. W. Driver, and J. T. G. Nichols, of Cambridge, Mass.; Dr. W. T. Jones, of Baltimore, Maryland State Vaccine Agent; Dr. G. G. Worthington, and a physician of Baltimore, whose name is not given, but who reports through Dr. Jones. Small-pox was prevalent in all of these cities, and the vaccinations referred to were, to a very great extent, done upon persons who had previously been successfully vaccinated. The whole number of vaccinations reported amounts to 78,176. It is to be noted, with regard to the 54,140 cases reported by Dr. O'Brien, that about 3,500 of them were done with humanized virus. The cases were not distinguished in his report, so that it is not known how many of these 3,500 were *primary* and how many *secondary* cases. But, as there were no failures in primary cases, the value of the report is not invalidated.

By an analysis of these reports, I have constructed the following tables:

TABLE 1.—PRIMARY VACCINATIONS.

	WHOLE NUMBER.	INSPECTED.	SUCCESSFUL.	UN-SUCCESSFUL.	SUCCESS PER CENT.
First trial:					
DR. O'BRIEN,....................	4,793	4,322	4,322	....	100.
DR. OTIS,..........................	22	22	22	....	100.
DR. DRIVER,.....................	157	157	155	2	98.72
DR. NICHOLS,.....................	16	16	16	....	100.
First trial with this virus, after other alleged bovine virus had failed once:					
DR. OTIS,.......................	15	15	14	1	93.33
First trial with this virus, after other alleged bovine virus had failed twice:					
DR. OTIS,.......................	2	2	2	....	100.
Second trial with this virus, after other alleged bovine virus had failed once:					
DR. OTIS,........................	1	1	1	....	100.
TOTAL PRIMARY VACCINATIONS.. ...	5,006	4,535	4,532	3	99.93

TABLE 2.—REVACCINATIONS, INCLUDING THOSE OF PERSONS WHO HAD HAD SMALL-POX, MODIFIED OR UNMODIFIED, NATURAL OR INOCULATED.

	WHOLE NUMBER.	INSPECTED.	SUCCESSFUL.	PARTIALLY SUCCESSFUL.	UN-SUCCESSFUL.	SUCCESS PER CENT.
First trial:						
DR. O'BRIEN,	49,347	25,656	23,547	..	2,109	91.00
DR. OTIS,	54	54	33	13	8	61.11
DR. FOLSOM,	42	42	34	..	8	80.90
First trial with this virus, after other alleged bovine virus had failed once:						
DR. OTIS,	18	18	3	10	5	16.66
Second trial:						
DR. OTIS,	8	8	..	2	6	00.
DR. FOLSOM,	6	6	5	..	1	83.33
Second trial with this virus, after other alleged bovine virus had failed once:						
DR. OTIS,	4	4	..	1	3	00.
Third trial:						
DR. OTIS,	3	3	..	..	3	00.
TOTAL SECONDARY VACCINATIONS.	49,482	25,791	23,622	26	2,140	91.59

TABLE 3.—VACCINATIONS OF PERSONS WHO HAD HAD SMALL-POX, MODIFIED OR UNMODIFIED, NATURAL OR INOCULATED.

	WHOLE NUMBER.	INSPECTED.	SUCCESSFUL.	UN-SUCCESSFUL.	SUCCESS PER CENT.
DR. O'BRIEN,	531	531	264	267	49.71
DR. FOLSOM,	2	2	....	2	00.
ANONYMOUS PHYSICIAN OF BALTIMORE,	35	35	16	19	45.71
TOTALS,	568	568	280	288	49.29

Table 4.—Vaccinations, concerning which it is not stated whether they were Primary or Secondary.*

	Whole Number.	Inspected.	Successful.	Un-successful.	Success Per Cent.
Dr. Jones,	17,738	17,738	13,590	4,148	76.61
Dr. Worthington,	1,758	1,758	1,580	178	89.87
Anonymous Physician of Baltimore,	2,149	2,149	1,369	780	63.70
Dr. Forster,	2,049	383	250	133	65.27
Totals,	23,694	22,028	16,789	5,239	76.21

It will be seen, sir, that these reports show a very high percentage of success—decidedly higher than the standard with which we set out. I would particularly call attention to the great proportion of successful revaccinations. With one exception, the gentlemen who have furnished these reports have not classified their successful results as "complete" and "partial." Considering that this is generally done by those who report results of revaccinations, it is to be regretted that it was omitted in these instances; I will, however, take the opportunity of expressing my decided conviction, that the common custom is erroneous. In any case, the result is either success or failure, and we may classify degrees of imperfection *ad infinitum*, to no good purpose. But, this is not the main point to which I would call attention: I would lay particular stress upon the fact, that these figures are not to be taken as exceptional, but that, in general, a much greater degree of success ought to be attained in revaccinations than the profession at large are aware of. During the past summer I had the opportunity of bringing these results to the attention of the British Medical Association, and I was then much gratified to hear Dr. Grieve, who was in charge of the Hampstead Hospital during the last epidemic of small-pox in London, express the same view, he taking my figures as a corroboration of the opinion.

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* The subjects are presumed to have been mostly adults and school-children, and it is stated that "a number of them had had small-pox."

These results, then, such as I have read them to you from these tables—results obtained, be it noted, with stored lymph sent by mail or express to distances of from two hundred to more than four hundred miles, often a week old before it started, the vaccinations extending over a period of several months (the results being, therefore, not a mere "lucky hit")—demonstrate, it seems to me, the utter groundlessness of the opinion, which even now frequently finds expression, that vaccination with animal virus is unsatisfactory in regard to the degree of success obtained.

When I began my investigations, this opinion was almost universal in this country, so that I found it a matter of great difficulty to persuade even my personal friends in the profession to give the Beaugency virus a trial. The wide-spread prevalence of this prejudice would seem to be due, in so far, at least, as recent events are concerned, very largely to the unfavorable report of Dr. Seaton (in the "Twelfth Report of the Medical Officer of the Privy Council"), who visited various Continental cities for the purpose of observing and reporting upon the practice of animal vaccination as there pursued. It must be admitted, sir, that, considering the facts which came under his observation, or were brought out in his subsequent correspondence with those having charge of the animal vaccine service in certain cities, he could not have made any other sort of report than that which he did make. The simple truth is, that the results which those gentlemen obtained were far from creditable, and they have, no doubt, greatly hindered the progress of animal vaccination; all owing to what I conceive to have been radical errors in the methods adopted, but which it does not come within my present purpose to discuss.

PROPOSITION II.—*The vaccinia produced by the use of animal vaccine is genuine, and as thoroughly protective against small-pox as is that obtained by the use of any other form of vaccine.*

This proposition is supported, *à priori*, by the more characteristic development, in the generality of cases, of the pock produced than of that which follows the use of long-humanized stocks. This has been often enough described, so that I need not dwell upon it now. I will remark, however, that opportunities of verifying the differences which have been noticed are rapidly growing fewer, owing to the fact that every year there is less and less long-humanized lymph used.

I have here Depaul's *brochure*, entitled "Sur la Vaccination Animale, Discours prononcé à l'Académie Impériale de Médecine dans la Séance du 3 Septembre, 1867." On page 46, I find a passage which I will translate, as follows: "In 1865, I myself attempted in vain to revaccinate three children who had already been vaccinated with cow-pox lymph, one month, six weeks, and two months, previously. In one case I went still further: upon a child vaccinated more than six weeks before, I inoculated, without success, *variolous virus*, taken a half hour previously from a patient in the fifth day of the eruption. I have several times seen children vaccinated only a few days before with cow-pox, living with impunity in the same room with one or more small-pox patients." In my own experience, there have occurred not a few instances of undoubted exposure to small-pox, in which, after revaccination with the animal virus, the disease has not shown itself. Possibly it would not have done so, even if the revaccinations had not been done, but the accumulation of such cases must be allowed very great weight.

It is not to be supposed that small-pox can never occur after vaccination with animal virus, even within a comparatively short time. I am, however, aware of only one instance in which it has occurred in this city. This case happened in the practice of the Northern Dispensary. A child was vaccinated there by Dr. Warner, the House Physician, in December, 1871, the animal virus being employed. Dr. Warner inspected the case on the eighth day, and considered the pock to be pursuing a regular course. I think there was no further examination, so that, for all that we know to the contrary, the febrile reaction and the areola may have been wanting. At any rate, the child was attacked, during the following March, with a very mild varioloid, so mild that Dr. S. F. Morris, who saw the child on behalf of the Board of Health, felt some hesitation, at first, as to the diagnosis. The child was sent to the hospital, where it made a rapid and complete recovery.

Such cases, though happily not common, are met with occasionally, and were in former years, long before animal vaccine was used. In this book, (the third volume of "Barthez et Rilliet's Traité clinique et pratique des Maladies des Enfants," second edition, Paris, 1861,) I find, on page 117, the statement, that "the youngest children are not wholly proof against post-vaccinal small-pox." "Thus," these authors go on to say, in a foot note on the same page, "of 96 children sick with small-pox at the *Hôpital des Enfants*, thirty had been vaccinated. Their ages were as follows: two were two years old; five were three years old; one was four years old; three were five years old; two were six years old; one was seven years old; two were eight years old; four were nine years old; two were ten years old; four were eleven years old; one was twelve years old; three were fourteen years old."

A Fellow of this Academy, (Dr. Leaming,) who, as I see, has done me the honor to be present this evening, and who, in former years, was one of the House and Vaccine Physicians of the Northern Dispensary, will acquaint you, I have no doubt, as he has already acquainted me, with the facts in connection with certain cases of post-vaccinal small-pox in infants, which came under his observation at that time, long before the introduction of animal vaccination into this country.

I could name a physician, also Fellow of the Academy, who, although now only thirty years of age, has had small-pox twice. His father, himself a physician, vaccinated him successfully at the age of thirteen months. At the age of thirteen years he had an attack of modified small-pox. He was afterward repeatedly, but unsuccessfully, vaccinated with good current lymph; yet, at the age of twenty-two years, he suffered from a second attack of small-pox, and this last time the disease appeared in its *unmodified* form. All his vaccinations were done with humanized lymph.

I mention these facts, not as novelties, for they are not so to those who are familiar with the history of small-pox and vaccination, but simply to illustrate the position I take, viz., that small-pox, which often occurs after vaccination, and occasionally after previous small-pox, is no more likely to occur after the use of animal than after that of humanized vaccine, but that neither the one nor the other is an absolute preventive of the disease.

PROPOSITION III.—*The use of animal vaccine does not entail the dangerously severe local inflammatory and general febrile complications which have been attributed to it by some writers.*

In support of this proposition, I have, as a matter of course, only negative evidence to offer. I may say, first of all, that in our experience at the New-York Dispensary, there has not yet been a single case of such complications, not even so much as a suppurating axillary gland, during the three years that we have used the animal virus; whereas, during the previous four years that I was in charge of the vaccine department, when we were using humanized virus, such complications were not very uncommon. During that time I even observed one case of chronic pyæmia following vaccination. It is true, that in adults, the animal virus occasionally causes a smart febrile reaction, with nausea, chilliness, pain in the back, etc., lasting for perhaps twenty-four hours, but never giving occasion for any anxiety; and that *eruptive vaccinia*, if we may admit the term, is rather more frequently observed than after the use of the old stock. But this is rare at best, and is, moreover, utterly free from danger. I think that the general experience of those who have used this virus will bear me out in this statement, although it is not to be assumed that never, under any circumstances whatever, will dangerous complications follow the use of this stock. Whenever these occur, however, our experience justifies us in assuming them to be due to extrinsic causes, as turned out to be true in regard to some cases reported to me by Dr. Alfred North, of Waterbury, Conn., last spring. Dr. North, who was using this virus, reported several cases of severe inflammatory (erysipeloid) complications, but he also stated that his fellow-practitioners in Waterbury were getting the same results, although in all probability they were using different stocks. At all events, I had not furnished them with their material. This fact, together with the absence of any such results in the practice of other gentlemen who had been supplied from the same lot with Dr. North, led us to conclude that the complications alluded to were owing to some contagion localized in Waterbury at the time, and wholly independent of the character of the vaccine.

Proposition IV.—*Animal vaccine is, equally with humanized vaccine, capable of preservation for a considerable length of time, for transmission to remote parts.*

The reports which I have received in regard to virus sent to great distances are not as numerous as I should like them to be. What there are, are, with very few exceptions, favorable, so far as regards quill-slips and tubes, particularly the former. The only instance, so far as I am aware, of the deterioration of quill-slips *in transitû*, when sent off in any considerable quantity, occurred in the terribly hot summer of 1872, in the case of several lots sent to San Francisco. I have sent them to all parts of the United States, including the Gulf States, at every season of the year, and the results, so far as I have been made acquainted with them, have been almost invariably satisfactory. I may mention a striking instance which occurred in my own experience during last summer. Being in London, I wrote to Dr. W. F. Cushman, who kindly took charge of the service during my absence, asking him to send me some quill-slips with which to vaccinate my own child. He sent me, by mail, eight quill-slips, which he had charged on the 9th of September. The letter reached London after I had left there, and was forwarded to me at Liverpool, arriving there the day before I sailed for home. Without opening the package, I placed it in my state-room trunk, and on arriving at New-York, October 4th, I took out the package, intending to test the vaccine on a calf at the first opportunity. It escaped my attention, however, and was not used until October 7th, lying neglected in a warm room in the mean time. On the date last mentioned, I used it for making six insertions on a calf, and four of these were productive of perfect pocks.

This I do not look upon as any thing extraordinary, for I have long felt convinced that, within reasonable limits, the length of time during which vaccine virus has been stored is one of the least important elements to be taken into consideration in accounting for the success or failure of any given series of vaccinations. I am aware that this is contrary to the general opinion, and I presume that a majority of the physicians of New-York are unwilling to use lymph which has been kept more than forty-eight hours, but I can only characterize this feeling as a prejudice—a prejudice not altogether devoid of evil effects; for it often happens that lymph of one particular lot is more energetic, even after the lapse of a considerable length of time, than that of another lot which may be much more recent, so that, in any case of positive exposure to small-pox, I prefer to rely on lymph which I have already tested to my satisfaction, rather than on that which is freshest. In regard to tubes, I have received very few reports, but I have sent them to Panama and to Japan, and have been informed that they proved satisfactory. Crusts form an apparent exception to my proposition. The bovine crust, as at present cultivated, does not retain its virtues so long as humanized crusts do. The reasons for this, however, attach rather to what happens to it before it is shed, than to any special difficulty in its subsequent preservation. Crusts of all sorts I consider to be, beyond all doubt, the very worst form of vaccine, so that this is a matter of comparatively little importance.

PROPOSITION V.—*The use of animal vaccine eliminates one of the elements in the causation of vaccinal syphilis, and thus helps to silence the anti-vaccination agitators.*

The essential portion of this proposition needs, I will venture to say, no argument. The corollary which it includes was powerfully illustrated by last winter's experience in Buffalo. When Dr. O'Brien obtained his first supplies of animal virus from me, he had, as he informed me, been fighting the epidemic for the better part of a year. His course of action was seriously hampered by the opposition which he met with in vaccinating the people. This opposition practically vanished on his being able to announce that he was employing animal virus, so that he was enabled to perform the large number of additional vaccinations mentioned in his report, and, in a few weeks, put a stop to the disease.

PROPOSITION VI.—*Animal vaccination is the most trustworthy safeguard against failure of the supply of vaccine in emergencies.*

To illustrate the truth of this statement, Mr. President, I will simply relate, before I close, that one day last winter I received from the Board of Commissioners of Public Schools, of Baltimore, a telegraphic order for quill-slips sufficient for 6,000 vaccinations. I sent the whole amount before the expiration of twenty-four hours. Now, I do not think that, under ordinary circumstances, this quantity of lymph could be obtained from children's arms, in so short a space of time, without violating the rules which should be observed in regard to the choice of subjects, to say nothing of other important details connected with the matter of taking lymph.

In the *discussion* which followed:

DR. ELLSWORTH ELIOT stated that he had used the animal virus almost exclusively during the past two years, and could bear testimony to the excellent results which it produced. In former years he had employed humanized virus, obtained sometimes from his own patients, and at other times from the dispensaries. So far as he was concerned, he had considered that he was using a good enough material; but he often had to delay the vaccination of children on account of the dislike which parents frequently expressed to having their children vaccinated with lymph from dispensary patients. They would ask him to wait until he could get lymph from his own cases. Since he had begun to use the animal virus, however, he had met with no difficulty of this sort. He had been very much gratified, too, at the degree of success which it had afforded, it never having failed, in his hands, in a single case of primary vaccination thus far.

The results were benign and in every respect satisfactory. Indeed, it was difficult for him to account for the determined opposition which a few of his professional friends made to the use of the bovine virus. He instanced one of these, who, on a certain occasion, gave expression to a decided feeling of that sort. He (Dr. Eliot) proposed to this gentleman to visit with him two infants, whom he had vaccinated with the bovine virus that day week. On inspecting the pocks, the gentleman was so struck with their fine appearance that he requested some of the lymph from them for his own use. Dr. Eliot was under the impression, however, that his friend was not yet thoroughly converted.

Dr. Eliot expressed himself as having listened with much interest to Dr. Foster's modest story of the results which had grown out of his efforts, and would remind the Academy that Dr. Foster had previously, in an essay which received the prize, for the year 1872, of the Alumni Association of the College of Physicians and Surgeons, done good service, in a literary way, in connection with this subject. There were two names, among those of New-York physicians past and present, of gentlemen to whom, in Dr. Eliot's opinion, the profession in New-York should feel deeply indebted in connection with the subject of vaccination. The first was that of Dr. Valentine Seaman, who first introduced the practice of vaccination into this city; the other was that of Dr. Foster, who had furnished them with their strongest weapon for overcoming popular prejudice against the practice. Highly as he appreciated Dr. Foster's efforts, however, he felt called upon to confess himself as one of those who, as Dr. Foster expressed it, entertained the prejudice in favor of very fresh lymph. He was always careful to procure his supplies as soon as possible after it had been brought down from Greenwich, and to this fact he attributed, in no small degree, his successful results.

DR. O'SULLIVAN stated that his experience, a very large one, more particularly in the vaccination of school-children, had been, for the most part, with the humanized virus, as issued for so many years by Dr. Loines, of the Eastern Dispensary, in whose practice in that institution, as well as at Quarantine, were vaccinated upward of 300,000 with satisfactory results. In his own experience of school-children, in the house-to-house vaccinations by the Board of Health, and in the hands of family practitioners, this virus had always proved thoroughly trustworthy. He saw no reason to doubt that the animal virus was equally so, only he had been under the impression that the Board of Health, which had experimented with it to a certain extent, had come to the conclusion that it was not, in certain cases, quite as satisfactory as the results from humanized virus. He had no doubt that it was carefully prepared, and was now informed that the animal virus used was not furnished by Dr. Foster, but was prepared under the supervision of the officers of the Board of Health.

Dr. O'Sullivan thought that the importance of this subject was deserving of something more than an evening's discussion, and, while not prepared to make any motion or request to that effect, he would suggest that the Committee on Vaccination might appropriately take the matter under consideration. He thought it due to the Academy that that committee should give more attention to this subject.

Dr. Caro had always, until recently, used the humanized virus. He had never seen any evil effects which he could attribute to it, and did not believe that, if proper precautions were taken (such, for instance, as not to take blood together with the lymph), there was ever any danger of conveying any constitutional taint. Recently he had vaccinated five children with animal virus procured from Dr. Foster, and in three of the cases the result had been successful. The two others had not yet been inspected. In one of the cases he had used this virus for the reason that he had, some time ago, vaccinated another child in the same family, and on that child, when the scabs fell off, the pustules were found ulcerated, enlarging in a short time to a considerable size, giving a great deal of trouble before healing. In this second child, on the sixth day after the vaccination, he had been called to see the case, and found a vesicular rash broken out over the child's body. The mother accused him of having used small-pox virus, but he was, to his great relief, able to clear himself at once in her estimation, by assuring her that he had used lymph direct from the calf, without going through the tedious and perhaps futile process of argumentation which would have been necessary had the virus been taken from the human subject. He was of opinion that some dormant disease, such as tuberculosis, etc., could be kindled in the system through the crisis produced by inoculation.

Dr. Caro coincided in the belief that one vaccination was sufficient for the lifetime of any individual, but nevertheless he never objected to revaccinate those who desired it. He always vaccinated on both arms, making two inoculations on each arm (when permitted), but never less than one.

Dr. Leaming's experience with the animal virus, furnished by Dr. Foster, had been quite recent and not very extensive, but he could state that the results had been satisfactory, so far as they went. Dr. Foster had alluded to his (Dr. Leaming's) experience in the matter of small-pox occurring within a short time after vaccination. He would mention the following case: Some years since, when he was vaccine physician of the Northern Dispensary, he vaccinated a child, with the same lymph with which he was vaccinating others—the lymph current in the dispensary—from whose arm, which presented the typical appearances, he took lymph on the eighth day. Having used up the lymph thus obtained, and his supply from other sources being scanty, he revisited this child at its home, for the purpose of obtaining the crust, but was very much surprised to find it exhibiting the eruption of varioloid. Dr. Leaming believed not only in the necessity of revaccination, but in repeated vaccinations—repeated at intervals of perhaps a year, until it could no longer be made to produce a local result. One vaccination might protect a certain proportion of subjects, but he considered it demonstrated that, in some persons—perhaps 25 per cent.— not even temporary protection, of a perfect character, would result from a single vaccination. He had felt this so strongly, that he had laid the matter before the Board of Trustees of the Northern Dispensary, during his incumbency of the vaccine physicianship, and measures had been taken by them to impress upon the community the necessity of repeated vaccination.

Dr. Leaming here read the following extract from his report, as vaccine physician, to the Trustees of the Northern Dispensary, (*see* "Twenty-fourth Annual Report of the Trustees of the Northern Dispensary, for the year ending April 4, 1851," p. 34.)

"In 1842, the Academy of Sciences in Paris offered a prize for the best treatise on 'the Value of Vaccination and Revaccination.' Thirty-five candidates responded to the call. M. Serres made a report on the comparative merit of the essays, in behalf of the committee appointed to decide, which was adopted by the Academy. He says: 'In Wurtemberg, 42,000 persons who have been revaccinated have only presented eight cases of varioloid; whereas, one-third of the cases of variola have latterly occurred on persons who had been vaccinated.'

"The following are the 'results of re-vaccination in the Prussian army during 1849: . . . There were 51,637 individuals revaccinated, of whom 39,116 had distinct cicatrices of the former vaccination, 8,706 had these in an imperfect condition, and 3,815 were destitute of them. The vaccination pursued a regular course in 30,457, an irregular one in 8,467, and failed in 12,713, succeeded on repetition in 2,862.

" 'Thus, then, of the 51,637 vaccinations, 33,319 were quite successful; vesicles running a normal course being produced. This proportion amounts to 64 per cent., and is about one per cent. more than was obtained in 1847 and 1848.' "

Dr. Janes had, in former years, as a matter of course, used the humanized virus solely, and had felt no reason to be dissatisfied with it. Ever since his connection with the Board of Health, his experience had been, in a great majority of cases, with the same virus.

When the Board of Health first began its system of public vaccination by house-to-house visitation, the gentlemen of the vaccinating corps were each given a clean lancet, and instructed to note down and report, carefully, any irregularities which might occur in their results. This they did faithfully, and, out of some 30,000 vaccinations done during the month of June, 1869, only the cases of sufficient irregularity to call for any special investigation were reported.

Very soon after the organization of the vaccinating corps, he had learned something which he would not have thought probable before, namely, that there were very few good vaccinators. It was no uncommon thing to find that, of two gentlemen vaccinating with the same virus, the one would obtain as great a degree of success as was to be expected, while the other would fail in very many of his cases. It was found useless to try to overcome this unskillfulness by didactic instruction, but it was speedily corrected, generally in the course of half a day's work, by sending out the unskilled vaccinator in company with one whose skill was known. It was quite evident to him, therefore, that the skill of the vaccinator was one of the chief elements in determining the results.

He regarded errors in collecting virus as another source of failure. It was a delicate operation to so open a vesicle as to obtain from it nothing but the pure lymph which it contained. This should be done before the areola is established, otherwise we should have the products of ordinary inflammation, which would vitiate the purity and efficacy of the lymph. He had noticed that some public vaccinators, in collecting lymph, were ambitious to obtain a large supply from each vesicle, and that by continuing to irritate the vesicle, even after it was exhausted of its lymph, a flow of serum was obtained, which appeared very well on the quill, but contained but little, if any, genuine lymph. He would, therefore, insist that in public vaccination the duty of collecting lymph be intrusted to persons especially skilled in this branch of the service. He did not wish these criticisms to be understood as applying to the family practitioner, but to those young men who see their first active service as public vaccinators, without previous training and experience.

He thought it not quite fair to count the experience of the Board of Health against animal vaccination as conducted by Dr. Foster, for the stock of bovine virus which they had used was entirely different from Dr.

Foster's, and he had never been able to satisfy himself of its origin. In regard to Dr. Caro's case, the eruption might have been vaccinal; but, in some of the cases of so-called eruptive vaccinia that had come under his observation, the eruption existed only on those parts of the body which could be reached by the patient's hand, (of the unvaccinated side,) so that he was disposed to ascribe the formation of such pocks to the transfer of lymph from the original pock, by the patient's scratching it, and then scratching other parts of the body

Dr. Harris regretted that, owing to the lateness of his arrival, he had not heard the whole of Dr. Foster's remarks. He had, however, felt a great interest in his investigations, and had been quite prepared to hear of the attainment of such results as had been related. He considered that vaccination in the City of New-York was very efficiently done, as evidenced by the comparative immunity of the city during the general small-pox prevalence of the past three years. Although the old stock of humanized virus had been used in perhaps the majority of cases, even during these three years, yet he was quite willing to recognise the fact, that the popular opposition to vaccination had been very notably diminished by the well-directed and patient endeavors of Dr. Foster to furnish the profession with a trustworthy supply of animal vaccine. The fact was now acknowledged, that this method of meeting the ordinary requirements for fresh and efficient virus was completely satisfactory, and that, for the great and sudden demand that occurs wherever small-pox begins to prevail, this method of supplying good vaccine was unspeakably important.

The family physicians had justly retained their allegiance to the doctrines of Jenner, and these experienced practitioners were faithful vaccinators, scrupulous in the selection of the vaccine they employed, and careful in their vaccinations. Such physicians were not slow to recognise such service as Dr. Foster was now giving.

In closing the discussion, Dr. Foster remarked that several collateral points had been raised, which, while not coming strictly within the scope of his propositions, were of great interest, but want of time would forbid their further discussion at the present time. In regard to Dr. Caro's case, the eruption might have been (1) chicken-pox, which sometimes very closely resembles varioloid; or (2) small-pox, the exposure and consequent infection having taken place several days before the vaccination; or (3) the so-called eruptive vaccinia, although the sixth day was rather early for it to appear. In regard to eruptive vaccinia, he was already on record as entertaining the view, which Dr. Janes had mentioned, that it was, in the great majority of cases, not truly eruptive, but occasioned by the accidental transfer of lymph from the original pock. If this were true, the fact of its occurring somewhat oftener after vaccination with bovine than with humanized lymph, would form an additional evidence of the activity of the stock.

Dr. Caro stated that he did not wish to be understood as imputing the eruption, in the case which he had referred to, to the fact of his having used the animal virus, neither did he consider the eruption as of any great consequence.

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